

IN DEPTH INSPECTION REPORT

D031085

P.I.N. 3501.60

B.I.N. 1093562

TEAM LEADER	Logan Bessel, P.E.	98781
		NYSPE LICENSE #
ASSISTANT TEAM LEADER	Samantha Lusher	
ASSISTANT TEAM LEADER		
ASSISTANT TEAM LEADER		
FEATURE CARRIED	I-481 Northbound	
FEATURE CROSSED	Manlius Center Road (NYS Route 290)	
DATE FIELD WORK BEGAN	February 7, 2022	
DATE FIELD WORK COMPLETED	February 9, 2022	

TABLE OF CONTENTS

- IN-DEPTH CONDITION DOCUMENTATION
- IN-DEPTH PHOTO DOCUMENTATION

BIN 1093562**Purpose of Inspection**

In-depth inspection was performed in 2013 and 2014 as part of PIN 3501.60; I-81 Viaduct Replacement project. This report serves to update the documentation of the existing bridge elements which will be rehabilitated as part of Phase 1 of the I-81 Viaduct project.

Visual Inspection

The general observations of this bridge during this inspection include concrete cracking and spalling. The paint system failed over 75% of the structure. The structural steel is showing signs of section loss, especially at the fascia beams. The bearings appear to be seized and no longer functioning as designed. Anchor bolts are broken or bent.

The field observations are shown on the plans. Below is a brief summary of conditions for each feature.

Superstructure

Deck – See Bridge Deck Evaluation Report.

Steel – See Structural Steel Inspection Summary.

Bearings – Bearings typically contained pack rust and did not appear to be functioning as intended. Anchor bolts are broken or loose.

Substructure

South Abutment – Concrete backwall contained isolated areas of delaminated concrete. Isolated spalling was located behind girders G1 and G6. The stem contained widespread delaminated concrete with vertical cracks and map-cracking. The deck joint above the abutment appeared to be leaking throughout with evidence of rust staining and moisture on the face of the backwall and bridge seat. The wingwalls are 100% map-cracked.

North Abutment – Concrete backwall contained 6” deep spalling above pedestal 1 and delaminated concrete above pedestal 6. The pedestals exhibited cracking, spalling and delaminated concrete. The abutment stem exhibited vertical cracks, areas of map-cracking and delaminated concrete. The wingwalls are 100% map-cracked.

BIN 1093562**Special Emphasis Inspection Required**

Non-Redundant/Fracture Critical Members – No

Pin and Hangers – No

Fatigue-Prone Welds – No

Non-Categorized Fatigue-Prone Details – No

Other (Specified in Text) – No

Special Emphasis Details

None

Overall Steel Condition

The steel showed signs of deterioration. The paint system is failing over 75% of the structure and bare steel was exposed. The fascia girders appeared to be in the worst condition with section loss in the web and bottom flanges throughout the length of the girders. All of the girders exhibited impact damage to the bottom flange over the NYS 290 Westbound lane. The damage includes dents and scrapes to the bottom flange.

Paint

The girders are painted. The paint system is failing over 75% of the structure. The paint is delaminated allowing the steel to corrode.

Section Loss

Section loss readings were taken at various points along the span. The readings are depicted on the framing plan and beam elevations attached. In general, the areas of most significant loss were the lower 18 inches of the web and the bottom flange. The fascia of girders G1 and G6 exhibited the most significant section loss.

IN-DEPTH CONDITION DOCUMENTATION

BIN: 1093562
I481 NB / RT 290

BEGIN ABUTMENT DETERIORATION SKETCH
NOT TO SCALE

DATE: 02/07/2022

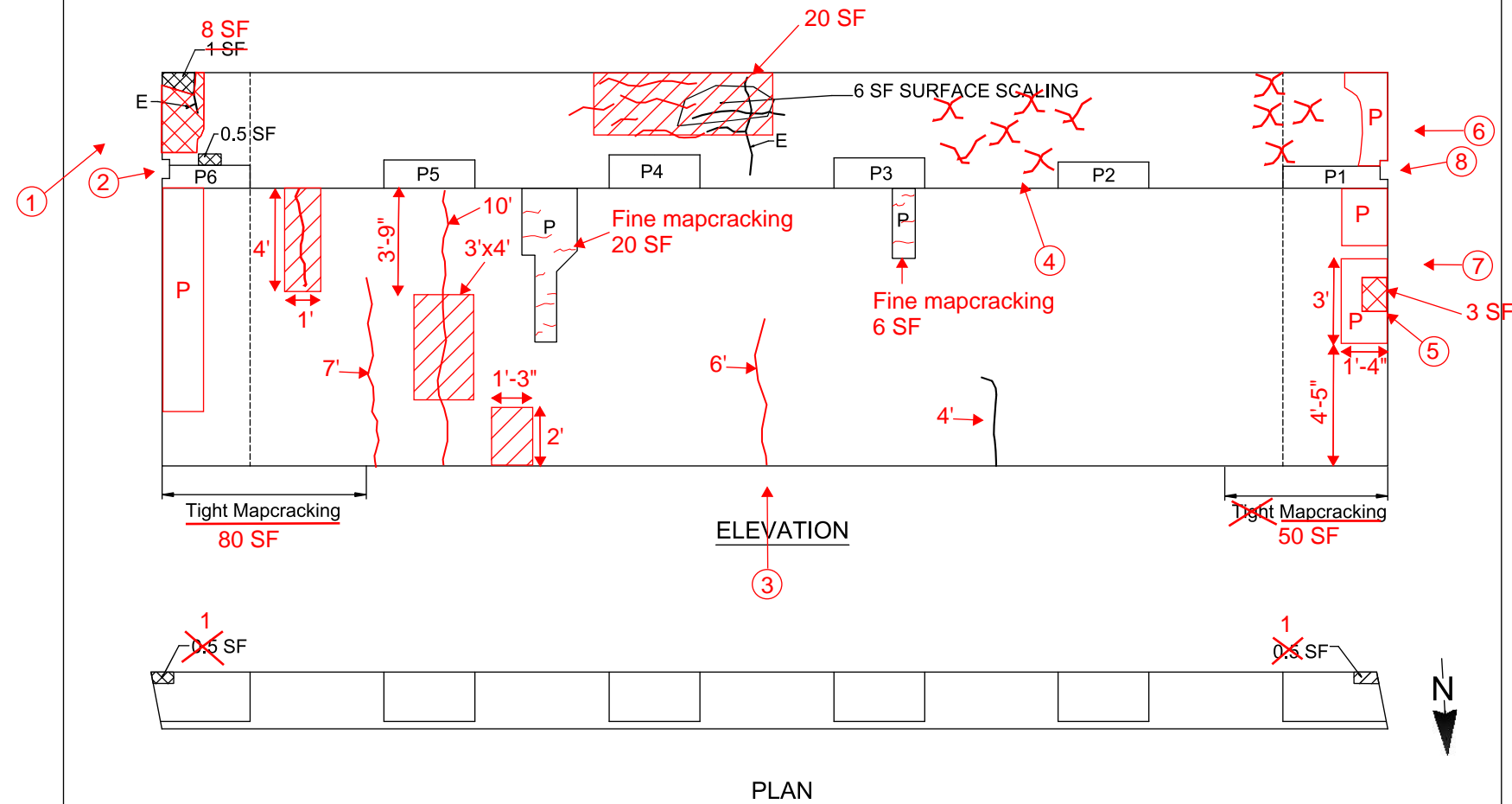


Photo Log Reference

- ① Left wingwall - spalling and mapcracking
- ② Upper left wingwall and backwall - spall
- ③ Abutment face - general view
- ④ Bay 2 - backwall between pedestal 3 and 2 - mapcracking
- ⑤ Abutment face - below pedestal 1, spall and scaling
- ⑥ Pedestal 6 - delamination of backwall
- ⑦ Lower right wingwall - repair patch, map cracking, rust staining
- ⑧ Pedestal 6 - spall

LEGEND

- Hollow Concrete (HC)
- Spall (S)
- Patch/Repair
- Crack (C)
- Hairline Crack (HL)

LEGEND			
	Hollow Concrete		Patch
	Efflorescence		Spall
			Crack

Quantities:

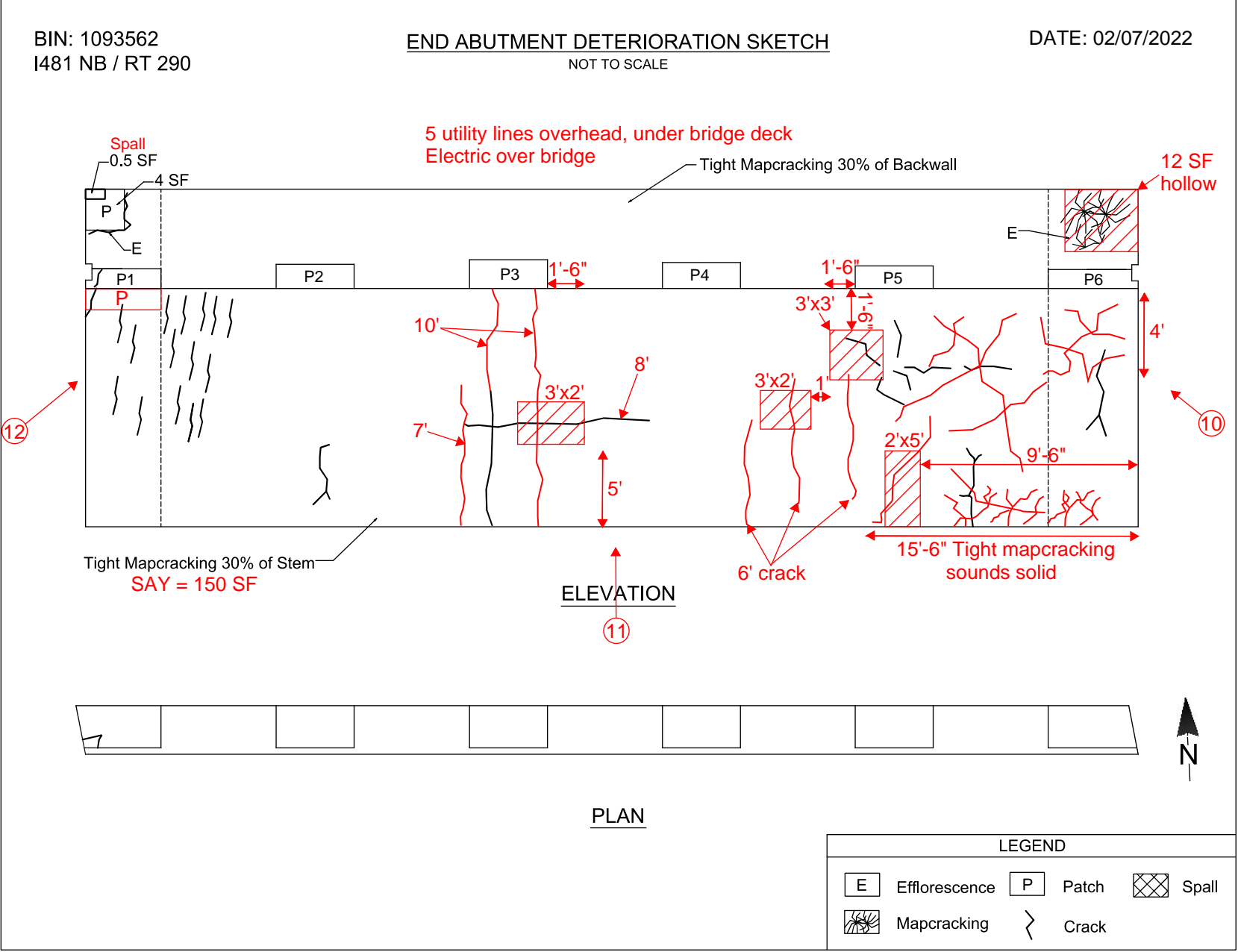
Spall Areas = 8 SF + 0.5 SF + 3 SF + 1 SF = 12.5 SF

Hollow Areas = 4 SF + 12 SF + 2.5 SF + 20 SF + 1 SF = 39.5 SF

Map-Cracked Area = 80 SF + 50 SF + 20 SF + 20 SF + 6 SF = 176 SF

Total Length of Cracks = 4' + 7' + 10' + 6' + 4' = 14 LF

Note: BLACK text, hatching and linework is from the 2014 in-depth inspection and was present at the time of the 2022 in-depth inspection.



Quantities:

Spall Areas = 0.5 SF

Hollow Areas = 6 SF + 6 SF + 9 SF + 10 SF + 12 SF = 43 SF

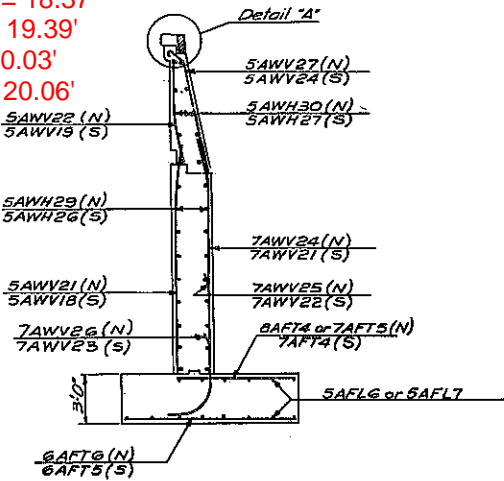
Map-Cracked Area = 150 SF + 150 SF = 300 SF

Total Length of Cracks = 7' + 10' + 10' + 8' + 6' + 6' + 6' = 53 LF

Note: BLACK text, hatching and linework is from the 2014 in-depth inspection and was present at the time of the 2022 in-depth inspection.

FED. RD. REG. NO.	STATE	FEDERAL PROJECT NO.	AID NO.	SHEET NO.	TOTAL SHEETS
1	NEW YORK	1-690-3(28)	1-481-2(116)	174	309
INTERSTATE ROUTE CONNECTION 570					
BUTTERNUT INTERCHANGE-COLLAMER					

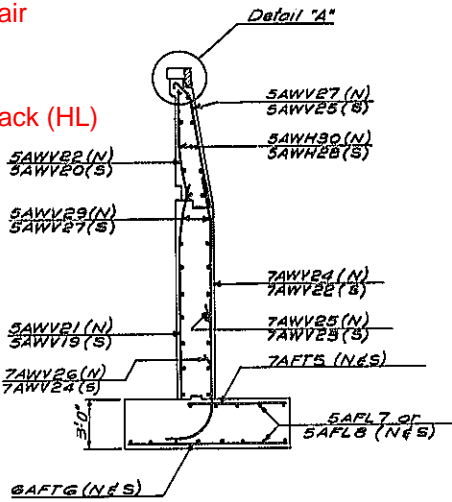
ONONDAGA COUNTY



TYPICAL SECTION
Scale 3/16" = 1'-0"

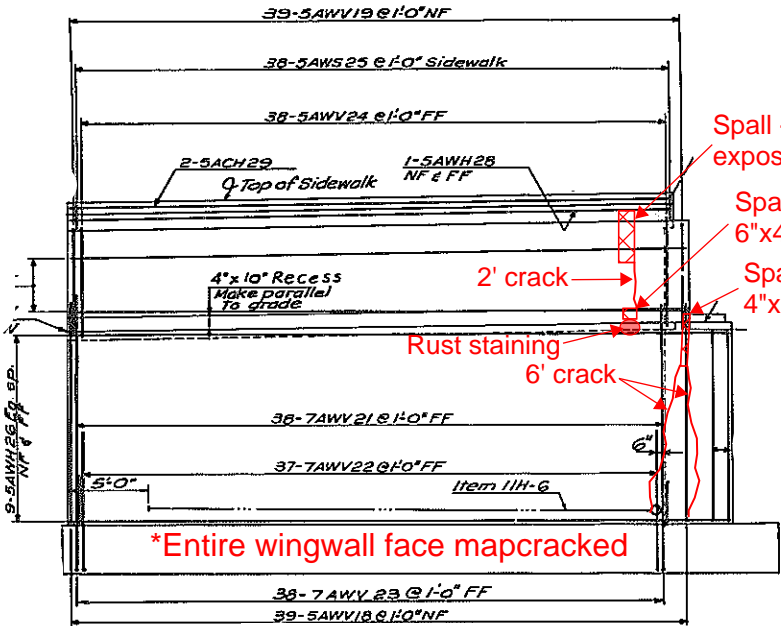
LEGEND

- Hollow Concrete (HC)
- Spall (S)
- Patch/Repair (P)
- Crack (C)
- Hairline Crack (HL)

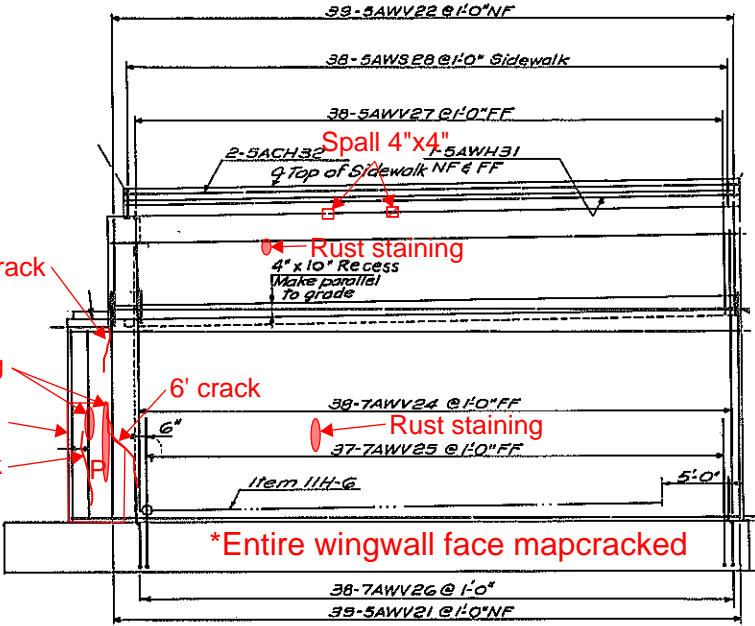


TYPICAL SECTION
Scale 3/16" = 1'-0"

All wingwall L= 35'
Begin Right Avg Height = 18.37'
Begin Left Avg Height = 19.39'
End Left Avg Height = 20.03'
End Right Avg Height = 20.06'

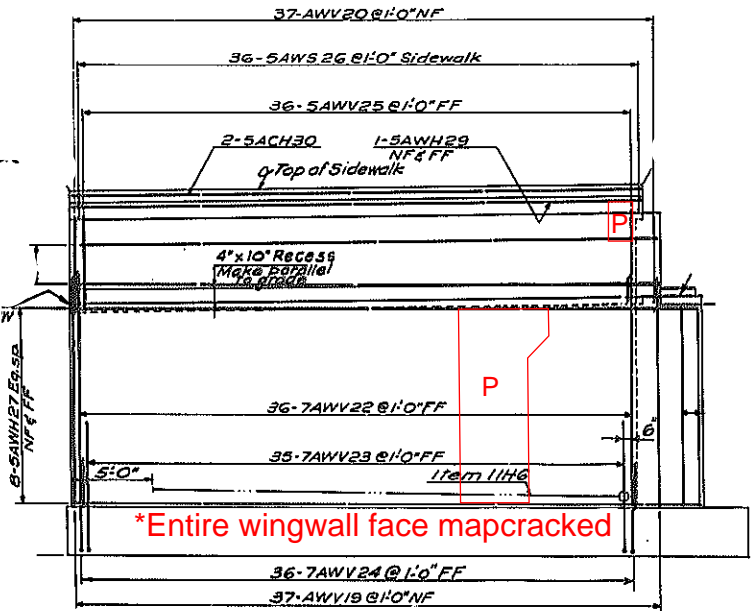


RIGHT WINGWALL

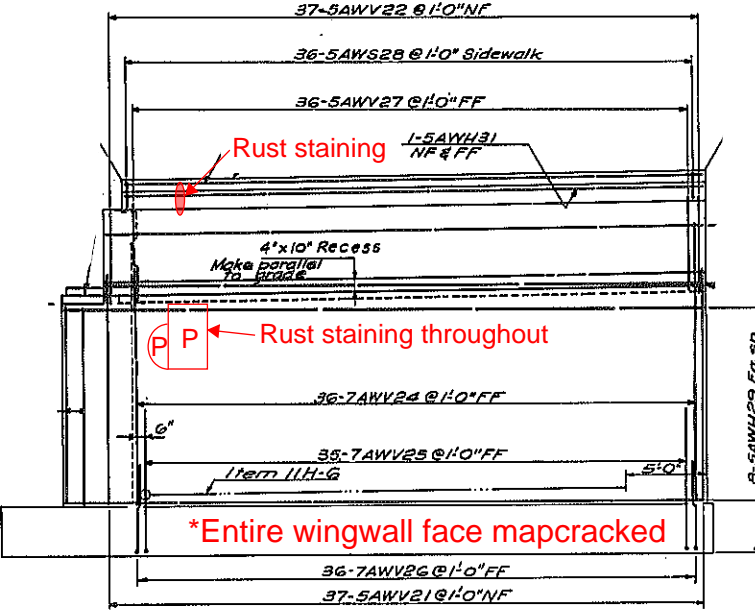


LEFT WINGWALL

BEGIN (SOUTH) ABUTMENT

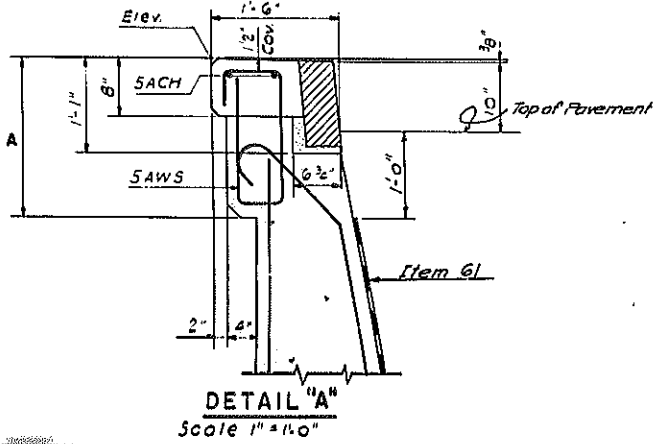


LEFT WINGWALL



RIGHT WINGWALL

END (NORTH) ABUTMENT



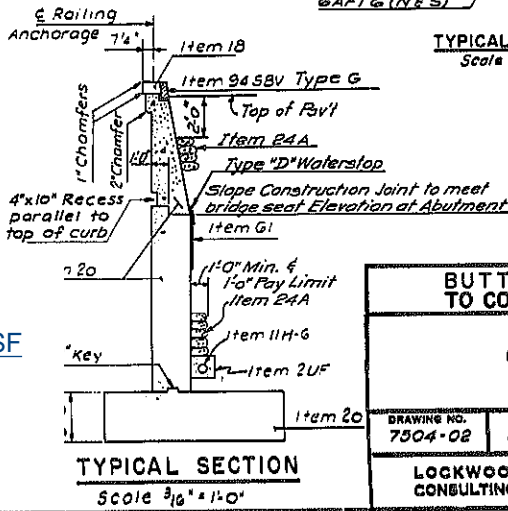
VALUE OF "A"		
SOUTHBOUND	NORTH ABUTMENT	1'-9 7/8"
	SOUTH ABUTMENT	1'-9 7/8"
NORTHBOUND	NORTH ABUTMENT	1'-10 1/8"
	SOUTH ABUTMENT	1'-10 1/8"

Quantities:

Spall Areas = 2.3 SF + 0.2 SF + 1.2 SF + 0.1 SF + 0.1 SF = 3.9 SF

Map-Cracked Area = 35' x (18.37' + 19.39' + 20.03' + 20.06') = 2721.25 SF

Total Length of Cracks = 6' + 6' + 2' + 6' + 4' + 2' + 5' + 6' = 37 LF



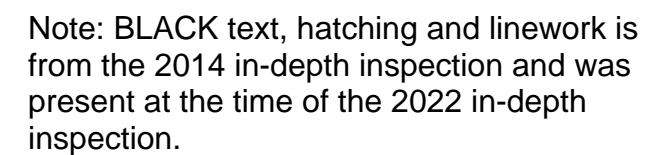
BR #1-N & 1-S

BUTTERNUT INTERCHANGE
TO COLLAMER F.A.I. 481

1.481 N.B. & S.B.
OVER S.H. 555
WINGWALLS

DRAWING NO.	SCALE	DATE	SHEET NO.
7304-02	As shown	8/15/70	174
LOCKWOOD, KESLER & BARTLETT, INC. CONSULTING ENGINEERS - SYOSSET, NEW YORK			

- ⑪ Bay 2 - Underside bridge deck - fine mapcracking
- ⑫ Bay 5 - Underside deck delamination
- ⑬ Bay 4 - Underside deck hollow mapcracking
- ⑭ Bay 4 - Underside deck general view - delamination and hollow
- ⑮ Bay 3 - Underside deck delamination
- ⑯ Bay 2 - Underside deck delamination
- ⑰ Bay 2 - General view
- ⑱ Bay 2 - Underside deck fine mapcracking
- ⑲ Bay 1 - End abutment mapcracking, communication lines
- ⑳ End span - Bottom Flange - Impact damage



NOTE:
Span 1 and 5 = 18'-9" x 9'-9" = 183 SF
Span 2 - 4 = 24'-6" x 9'-9" = 239 SF

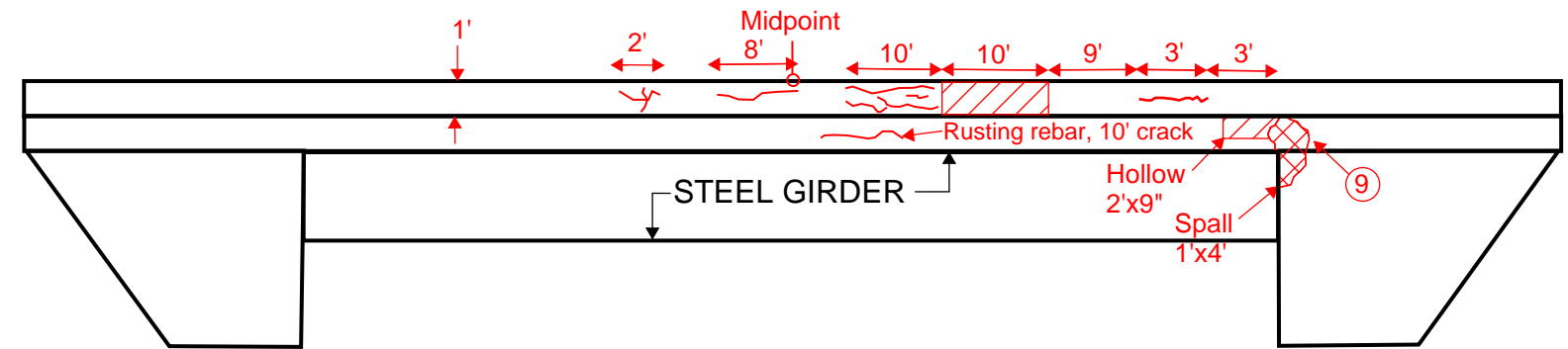
BIN: 1093562
I481 NB / RT 290

FASCIA ELEVATION VIEW

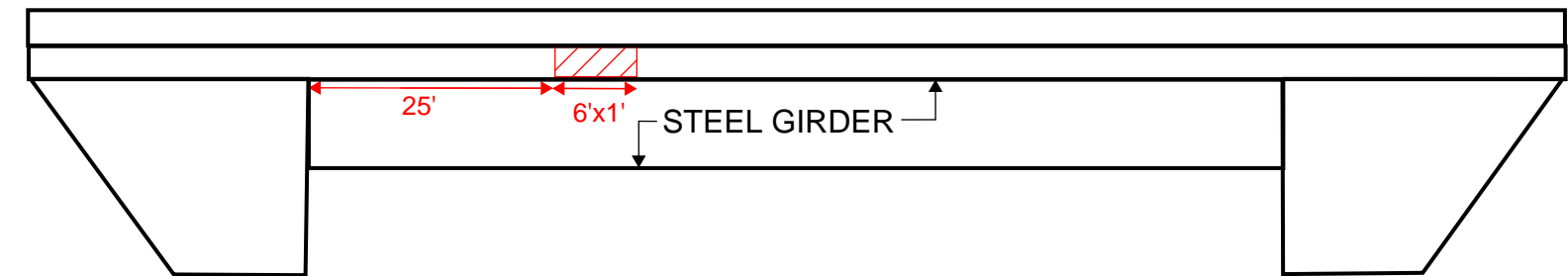
DATE: 02/07/2022

[Photo Log Reference](#)

⑨ Spall in bridge overhang joint








EASTBOUND VIEW
NOT TO SCALE



WESTBOUND VIEW
NOT TO SCALE

Delaminated Area = 21.5 SF
Spall Areas = 4 SF
Hollow Areas: 10 SF + 1.5 SF + 6 SF = 17.5 SF
Map-Cracked Area = 2 SF + 10 SF = 12 SF
Total Length of Cracks = 8' + 10' + 3' = 21 LF

LEGEND

-  Hollow Concrete (HC)
-  Spall (S)
-  Patch/Repair
-  Crack (C)
-  Hairline Crack (HL)

BUTTERNUT INTERCHANGE TO COLLAMER F.A.I. 481			
BRIDGE No. 1 - NORTHBOUND I 481 OVER S.H. 555 N.B. SUPERSTRUCTURE			
DRAWING NO. 7504-02	SCALE As shown	DATE 8/15/70	SHEET NO. 175
LOCKWOOD, KESSLER & BARTLETT, INC. CONSULTING ENGINEERS - SYOSSET, NEW YORK			

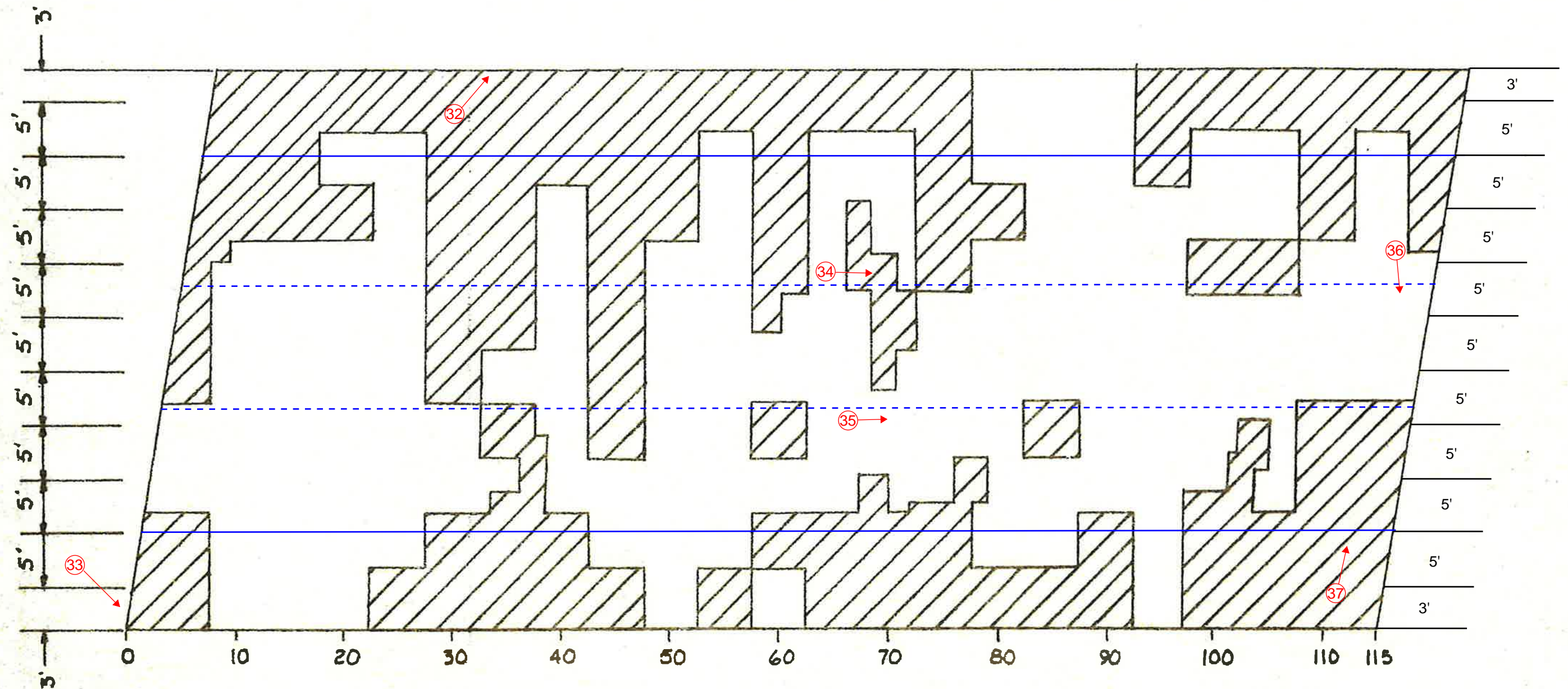


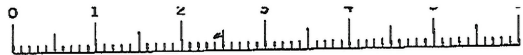
Photo Log Reference

- ③② Bridge deck left guiderail - rusting
- ③③ Begin bridge deck joint - right shoulder - puddling
- ③④ Bridge deck - general view
- ③⑤ Bridge deck - general view
- ③⑥ End bridge joint center lane - cracking through travel lanes to right shoulder
- ③⑦ End bridge joint right shoulder - cracking through travel lanes to right shoulder

Note: BLACK text, hatching and linework is from the 2014 in-depth inspection and was present at the time of the 2022 in-depth inspection.

LEGEND

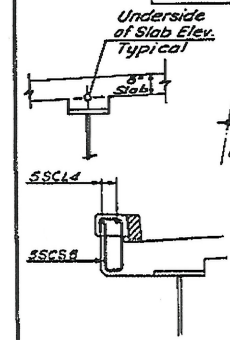
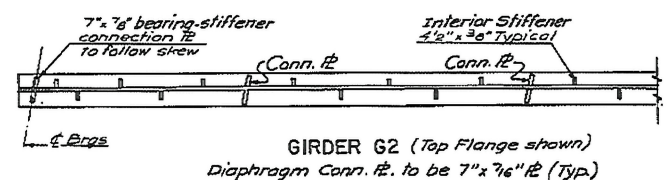
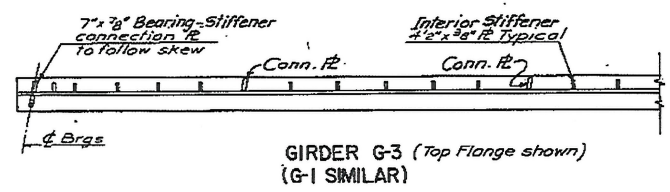
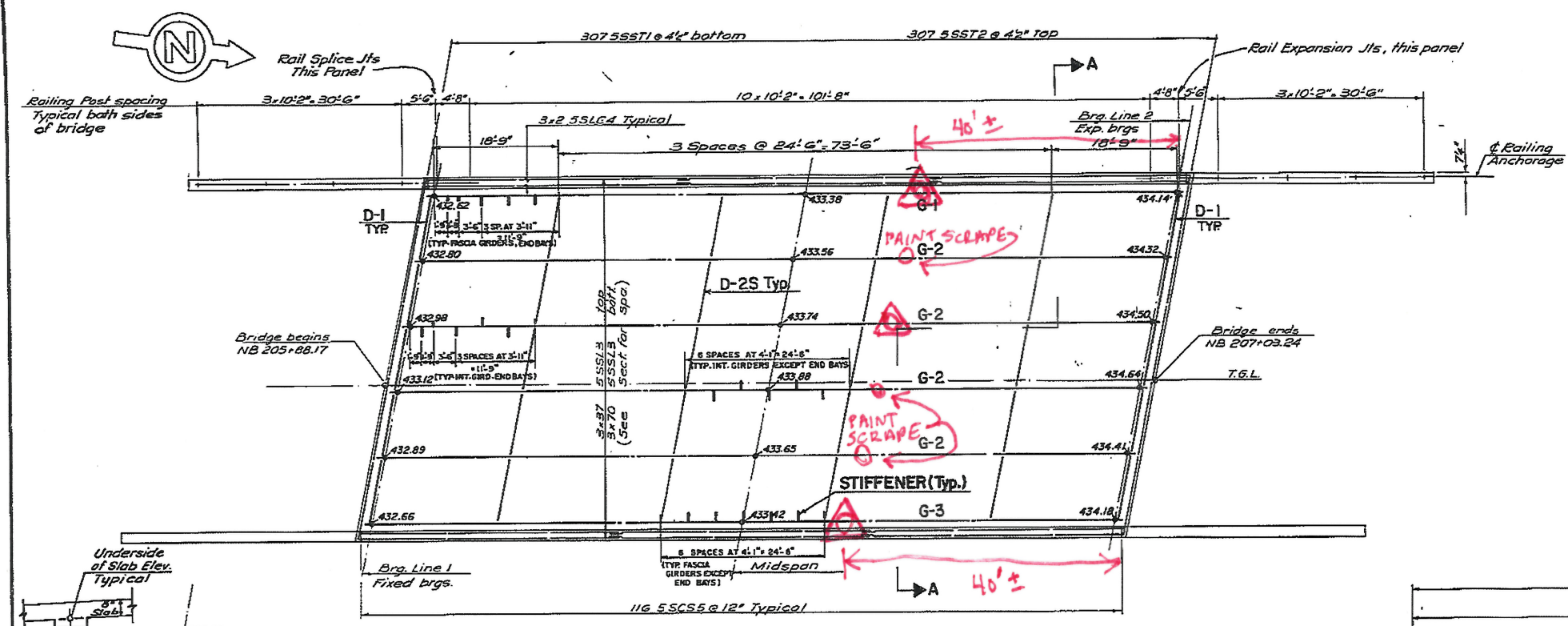
- Solid striping (white and yellow)
- - - White dashed striping



F.I.S.H. 70-7

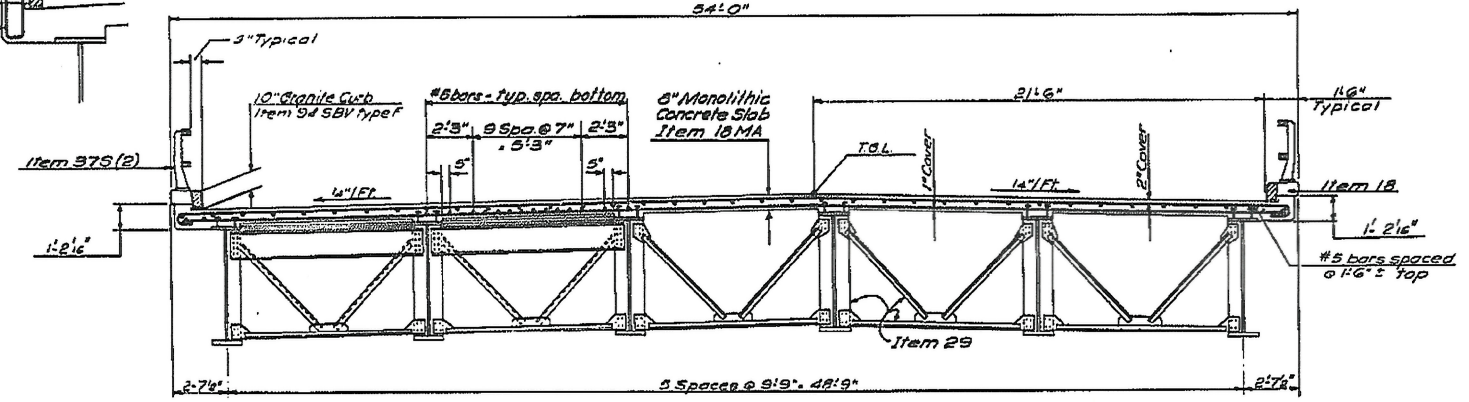
FED. RD. PROJ. NO.	STATE	FEDERAL AID NO.	SHEET NO.	TOTAL SHEETS
1	NEW YORK	1-680-8(28) 1-481-2-116	175	305
INTERSTATE ROUTE CONNECTION 570 BUTTERNUT INTERCHANGE-COLLAMER				

ONONDAGA COUNTY

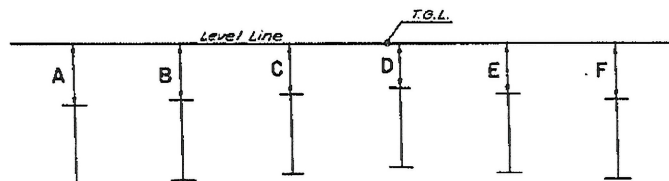


Indicates Underside of Slab Elevation

PLAN
Scale 1"=10'



SECTION A-A
Scale 1/4"=1'

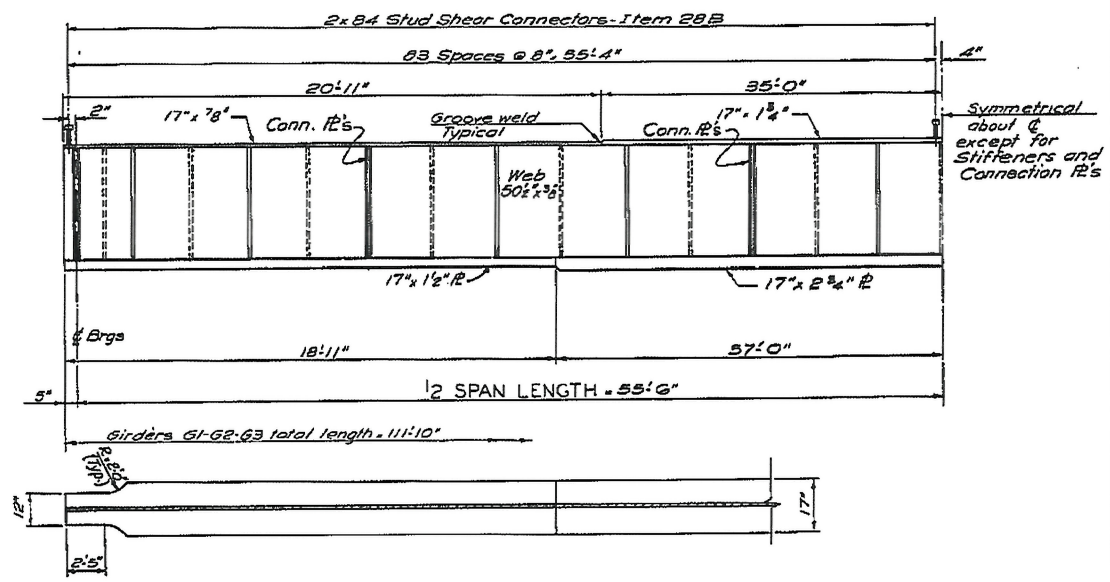


THEORETICAL VERTICAL MEASUREMENTS AT & BRG.

BRG. LINE	VERTICAL MEASUREMENTS TO TOP OF STEEL					
	A	B	C	D	E	F
1	1'5 1/4"	1'3 3/8"	1'1"	1'0 1/8"	1'2 1/8"	1'4 13/16"
2	1'5 1/4"	1'3 3/8"	1'1"	1'0 1/8"	1'2 1/8"	1'4 13/16"

ADJUSTMENT FOR CAMBER		
	FASCIA GIRDER	INTERIOR GIRDER
SLAB CONCRETE	1 3/16"	2 3/8"
V.C.	0"	0"
SUPERIMPOSED DEAD LOAD	7/8"	3/8"
D.L. STEEL ERECTED	1 1/8"	1 1/8"
TOTAL	2 13/16"	3 3/8"

△ - IMPACT DAMAGE
○ - PAINT SCRAPE ONLY FROM VEHICLE



PLAN-BOTTOM FLANGE
No Scale

- Notes:
- For detail of diaphragms see sheet 129
 - For weld sizes see sheet 129

2-9-22
BIN 1093562

BUTTERNUT INTERCHANGE TO COLLAMER FA.I. 481			
BRIDGE No. 1 - NORTHBOUND 1481 OVER S.H. 555 N.B. SUPERSTRUCTURE			
DRAWING NO.	SCALE	DATE	SHEET NO.
7504-02	As shown	8/5/70	175
LOCKWOOD, KEEGLER & BARTLETT, INC. CONSULTING ENGINEERS - SYRACUSE, NEW YORK			

IMPACT DAMAGE PLAN

As Checked by: J. E. Egan
Made by: M. Miro
Designed by: A. S. Sampselle

IN-DEPTH PHOTO DOCUMENTATION



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

Sheet 1 of 19

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: BEGIN ABUTMENT– LEFT WINGWALL
SPALLING AND MAPCRACKING

PHOTO 1



DESCRIPTION: BEGIN ABUTMENT – LEFT WINGWALL
SPALL AND BACKWALL SPALL

PHOTO 2



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

Sheet 2 of 19

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: BEGIN ABUTMENT – GENERAL VIEW

PHOTO 3



DESCRIPTION: BEGIN ABUTMENT – BAY 2 – BACKWALL
BETWEEN PEDESTAL 3 AND PEDESTAL 2 –
MAPCRACKING

PHOTO 4



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

Sheet 7 of 19

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: BEGIN ABUTMENT – ABUTMENT SPALL AND SCALING

PHOTO 5



DESCRIPTION: BEGIN ABUTMENT – PEDESTAL 6 VIEW – GIRDER PAINT CONDITION, DELAMINATION OF BACKWALL

PHOTO 6



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

Sheet 3 of 19

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: BEGIN ABUTMENT – LOWER RIGHT WINGWALL REPAIR PATCH, MAP CRACKING AND RUST STAINING

PHOTO 7



DESCRIPTION: BEGIN ABUTMENT – PEDESTAL 6 SPALL

PHOTO 8



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

Sheet 4 of 19

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: BEGIN – BRIDGE OVERHANG – SPALL IN JOINT

PHOTO 9



DESCRIPTION: END ABUTMENT – LOWER RIGHT WINGWALL REPAIR PATCH, MAP CRACKING AND RUST STAINING

PHOTO 10



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

Sheet 5 of 19

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: END ABUTMENT – GENERAL VIEW

PHOTO 11



DESCRIPTION: END ABUTMENT – LEFT WINGWALL
REPAIR PATCHES, MAPCRACKING

PHOTO 12



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

Sheet 6 of 19

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: FASCIA – GENERAL VIEW – PAINT
CONDITION, CRACK ALONG CONCRETE
OVERHANG

PHOTO 13



DESCRIPTION: BAY 4 – GIRDER 5 – GENERAL VIEW

PHOTO 14



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

Sheet 8 of 19

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: FASCIA – GENERAL VIEW

PHOTO 15



DESCRIPTION: BAY 1 – GIRDER 2 – UNDERSIDE
BRIDGE DECK FINE MAPCRACKING

PHOTO 16



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: BAY 2 – UNDERSIDE BRIDGE DECK –
FINE MAPCRACKING

DESCRIPTION: FASCIA – FLAKING PAINT – UNDERSIDE
BRIDGE OVERHANG STAINING

PHOTO 17

PHOTO 18



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

Sheet 10 of 19

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: UNDERSIDE OVERHANG CONCRETE STAINING

PHOTO 19



DESCRIPTION: FASCIA AND BRIDGE OVERHANG – GENERAL VIEW

PHOTO 20



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: FASCIA – GENERAL VIEW –
COMMUNICATION WIRES

DESCRIPTION: BAY 5 – END ABUTMENT – UNDERSIDE
BRIDGE DECK DELAMINATION

PHOTO 21

PHOTO 22



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

Sheet 12 of 19

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: BAY 4 – END ABUTMENT – UNDERSIDE
BRIDGE DECK MAPCRACKING AND
HOLLOW

PHOTO 23



DESCRIPTION: BAY 4 – GENERAL VIEW

PHOTO 24



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: BAY 3 END – UNDERSIDE BRIDGE DECK DELAMINATION

DESCRIPTION: BAY 2 END – UNDERSIDE DECK DELAMINATION



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

Sheet 14 of 19

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: BAY 2 END – GENERAL VIEW

PHOTO 27



DESCRIPTION: BAY 2 END – UNDERSIDE DECK FINE
MAPCRACKING

PHOTO 28



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: BAY 1 END – ABUTMENT
MAPCRACKING, COMMUNICATION
LINES, BACKWALL

PHOTO 29

DESCRIPTION: BAY 1 – GENERAL VIEW

PHOTO 30



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

Sheet 16 of 19

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: FASCIA – GENERAL VIEW

PHOTO 31



DESCRIPTION: BRIDGE DECK GUIDERAIL RUSTING OUT

PHOTO 32



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: BEGIN BRIDGE DECK JOINT RIGHT SHOULDER – PUDDLING

PHOTO 33



DESCRIPTION: BRIDGE DECK GENERAL VIEW – LEFT TRAVEL LANE – AGGREGATE IN GOOD CONDITION , MIDDLE TRAVEL LANE – AGGREGATE WORN

PHOTO 34



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: BRIDGE DECK – RIGHT TRAVEL LANE
AGGREGATE COMPLETELY POLISHED
, CRACKING

PHOTO 35



DESCRIPTION: CENTER LANE – END BRIDGE JOINT –
CRACKING THROUGH TRAVEL LANES
TO RIGHT SHOULDER

PHOTO 36



C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: (315) 455-2000
Fax: (315) 455-9667
www.cscos.com

I-481 NB over Manlius Center Rd BIN 1093562



DESCRIPTION: RIGHT SHOULDER – END BRIDGE JOINT
– CRACKING FROM CENTER LANE TO
RIGHT SHOULDER

PHOTO 37



DESCRIPTION: END SPAN – LEFT FASCIA – IMPACT
DAMAGE LINE – BOTTOM FLANGES

PHOTO 38